Molecular basis of host specificity of *Laverania* parasites

Awarded in 2015 Nobel Prize in Physiology and Medicine for Professor Tu Youyou from China, for the discovery of artemisinin, was not only honoring her personal contribution to the reduction of mortality among patients with malaria, but also paying attention to the relevance of global and still unresolved problem of malaria in the world.

The molecular mechanisms responsible for host restriction of *Laverania* parasites, infecting great apes and humans, are still pour understood. Although several explanations are possible, the blood stage of *Plasmodium* infection is of particular interest and it is suggested that a host-specific barrier exists at the merozoite-erythrocyte stage of infection. It was concluded, that in the evolution of the parasite infecting gorillas (*Plasmodium praefalciparum*) the host change for humans occurred, giving the new species: *Plasmodium falciparum.* Probably, this parasite specificity change was related to glycoproteins and its sugar moieties present on human erythrocytes.

The aim of this project is a detailed evaluation of the molecular basis of great apes and human parasites host specificity. By comparison the specificity of the recombinant EBA-140 binding ligand of chimpanzee, gorilla and human merozoites, we suppose to explain evolutionary change in *Plasmodium* specificity, which allowed the "monkey" parasite adapt to humans.

Based on successful results of expression the recombinant human and chimpanzee EBA-140 ligand in insect cells, we plan to express, in mammalian HEK 293 cells, other *Laverania* ligands. Two gorilla species (*P. praefalciparum* and *P. adleri*) and three chimpanzee species (*P. reichenowi, P.gaboni* and *P.blacklocki*) were choosen. The binding of these ape recombinant EBA-140 ligands to erythrocyte glycophorins C and D and sialic acid residues on their sugar chains will be examined and compared to human *P. falciparum* EBA-140 ligand using the ELISA method, immunoblotting and technique of surface plasmon resonance (SPR).

We hope to evaluate the binding specificity of the recombinant *Plasmodium* EBA-140 ligands and explain the differences between chimpanzee, gorilla and human EBA-140 ligand that allowed to emerge the human parasite. It will allow us to contribute to explaining the "host-switch" conception in the evolution of human deadly *P. falciparum* strain.